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DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
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GENERAL NOTE

Owing to the current nature of the investigations mentioned in the Technical News Bulletin, sometimes it will be impossible to supply printed information regarding them. However, in these cases, when the investigation has progressed sufficiently far, the Bureau will be pleased to furnish technical data to those engaged in the particular application of the subject, in order to avoid the delay incident to publication.

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1 The Sixteenth Annual Conference on Weights and Measures

The first item in the May Bulletin gave a brief notice of the conference of weights and measures officials from all parts of the country which was to be held at the Bureau of Standards during May. Sessions occupied the period from May 21 to 24 inclusive, and were very well attended. In connection with the conference, an exhibition of weighing and measuring appliances was arranged in the Industrial Building.

As is probably well known, there is, with but very few exceptions, no national law governing weights and measures. Some of the units of weight and measure are fixed by the National Government, but the framing of laws by which the use of these standards is made compulsory in ordinary trade is left largely to the states and cities. The regulation of local weights and measures conditions by state and local law has distinct advantages, as those best acquainted with these conditions are made responsible for the enforcement of weights and measures regulations in the different localities. On the other hand, unless some arrangement is made for a national gatheringat which weights and measures officials from every section of the country can exchange ideas and learn what is going on in territories other than their own, a great and undesirable diversity of weights and measures regulations would be sure to result. The need for some such conference was felt very early by the Bureau, and, conse-

quently, the first National Conference on Weights and Measures was held at the Bureau of Standards in 1905. With the exception of the period when this country was at war, these conferences have been held annually since that date.

The four days of the conference just passed were divided as follows: The first day was devoted to reports of the delegates from the various states. It is interesting to note that delegates from California, Colorado, Connecticut, District of Columbia, Illinois, Indiana, Louisiana, Massachusetts, Minnesota, New Hampshire, Pennsylvania, South Carolina, Vermont, Virginia, and Wisconsin submitted reports, thus covering the greater part of the country.

The second day was given over to officials from the cities and counties, and papers dealing especially with their problems were presented.

The third day, in turn, was devoted to various papers, including one on "The Elimination of Sales by Gross Weight," "The Recommended Abolition of Bushel Weights," "The Divergence of Bread Labeling Requirements," and the "Standardization of Loaves of Bread." A part of the meeting on that day was occupied in a discussion of fabric measuring machines.

On the last day of the session, "Commodity Tolerances," "The Sale of Small Amounts of Coal by Weight," and the "Standardization of the Ton Used in Measuring Coal" were discussed. A resolution was adopted calling upon Congress to set standards for coal covering specifications as to quality, heat values of the various grades, and the effect upon the same of exposure to weather during transit and storage.

Another resolution requests Congress and the Legislatures of the several states to enact laws establishing the hundredweight instead of bushel weight as the basis for buying and selling grain, vegetables, and similar commodities. Other resolutions, which were passed, called for papers and discussions on the following subjects at the next conference: Gasoline meters, taxi meters, and the abolition of dry measures.

A resolution was passed expressing the appreciation of the conference for the work of Dr. S. W. Stratton, its retiring President and former Director of the Bureau of Standards; and it was voted to thank Secretary Hoover, Dr. George K. Burgess, the present Director of the Bureau, and Mr. W. A. Durgin, Chief of the Division of Simplified Practice, and the various manufacturers of weighing and measuring devices for the part which they played in making the conference a success:

The following officers were elected for next year:

President, Dr. George K. Burgess, Director of the Bureau of Standards.

1st Vice-president William B. McGrady, Chief of the Bureau of Weights and Measures, State of Pennsylvania.

2nd Vice-president	I. L. Miller, State Commissioner of Weights and Measures of Indiana.
Secretary	F. S. Holbrook, co-chief of the Division of Weights and Measures, Bureau of Standards.
Treasurer	J. H. Foley, State Superintendent of Weights and Measures of New Jersey.

2 Standardization of Wood Screws

Circular No. 140 of the Bureau of Standards has just been issued and can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5¢ a copy. It deals with the work which has been carried out by the Federal Specifications Board on the standardization of wood screws, and the standards set forth in this circular will be used in all future government purchases.

At least two systems of numbering wood screws to designate the diameter have been used in the past; methods of measuring lengths have been hopelessly at variance; and the number of threads per inch for a given size has not been the same for different makes. All this confusion has been eliminated and the dimensions of wood screws made uniform throughout the United States as the result of a cooperative agreement among the manufacturers, the Bureau of Standards, and the technical section on builders hardware of the Federal Specifications Board.

The system of numbering to be used henceforth is the same as that now employed in designating machine screw sizes, except that diameters above No. 12 are also designated by numbers. This means, for example, that a No. 10 wood screw will have the same diameter as a No. 10 machine screw. Uniform methods of measuring diameter and length and uniform tolerances in these dimensions were adopted together with a standard angle for the under side of the heads of flat and oval head screws. The number of sizes of brass and steel screws manufactured as standard was reduced from 555 to 291, a reduction of 47%, while at the same time retaining a sufficient variety for every need. This reduction should benefit the manufacturer, the dealer, and the user.

3 Cold Working of Copper

The last Bulletin contained mention of the work of the Bureau of Standards on the scratch hardness of copper which has led to some interesting results regarding the effect of cold working of this material. As was stated in this item, the effect of cold deformation is first to harden the metal. As the deformation continues, the metal softens as measured by the scratch hardness and by the micro-Brinell methods.

During the past month the effect of annealing on such worked specimens has been considered. Low-temperature annealing, that is, at 100°C softens all worked specimens somewhat, but the general form of the hardness curve is still preserved. After annealing at a higher temperature all

specimens showed the same hardness, thus indicating that thinness of the rolled material does not affect materially the results of the scratch hardness test. This is an important point and suggests the use of this method of hardness testing on such specimens as are too thin to permit the determination of hardness by other more familiar methods. The results obtained with pure iron and with an iron-carbon alloy (low-carbon) were of the same general character as those with copper and thus helped to confirm the conclusions which had been tentatively reached.

4 Etching Reagents for Alloy Steels

This investigation which has been in progress at the Bureau for some time has yielded the following results to date: The metallographic etching of alloy steels with the usual acid etching reagents fails to identify the different constituents that may be present in the alloy steel, such as the carbide of iron, chromium, tungsten or vanadium, tungstide of iron, and possibly complex compounds as double carbides. This is of particular importance where two or more of the constituents are present simultaneously in the microstructure as has been found to be the case with high-speed steels and iron-tungsten-carbon alloys.

It was seen early in the investigation that, on the one hand, the use of the usual inorganic acids offered little hope of success because of the general resistance of the above-mentioned constituents to the corrosive action of the acids, while, on the other hand, alkaline solutions of an oxidizing nature offered considerable promise in producing distinctions by means of etching characteristics. A little experimental work was next carried out on various alkaline solutions with and without the use of oxygen gas or oxidizing agents, the results of this work being the development of a new etching reagent, namely, a potassium permanganate and sodium hydroxide mixture.

With the object of establishing the identity of the metallographic constituent known or believed to be present in the microstructure by noting its behavior toward the various etching reagents, etching tests were made on various amounts of the alloying element and of carbon. For this work a number of etching reagents of an alkaline nature, among which were several well known reagents, such as sodium picrate, Yatsevitch's reagent, etc., were used. Heat-tinting was also tried. The method of sequence etching or etching with two or more reagents in succession without any repolishing of the specimen between the etchings was used with success in cases where more than one constituent is present in the microstructure, as in high speed steels.

The results obtained so far show that it is possible, by proper selection of the etching reagent, to determine in a satisfactory manner the presence or absence of the different constituents in the micro-section and also to distinguish

between several of the constituents when two or more are present in the same micro-section, as, for example, cementite and chromium carbide, or cementite and iron tungstide. No method has as yet been found for distinguishing between chromium carbide and tungsten carbide other than from a consideration of the shape of the particles which these constituents have been found to assume should both occur in the same micro-section.

5 Gases in Metals

Tests conducted at the Bureau of Standards on the completeness of recovery of oxygen from oxides of iron and silicon in the vacuum fusion method for gases and metals have indicated complete reduction and recovery in both cases. Other oxides which may be present in steels are now being tested. Through the cooperation of a manufacturer of malleable cast iron, some tests have recently been made which indicate that results for oxygen by the Ledebur method on white cast iron are of little value because of the surface oxidation of the sample during its reduction to a finely divided form. The apparent oxygen content of the metal as a fine powder is about 100 times, and as a coarse powder about 50 times the true oxygen content of the material, as given by vacuum fusion analysis on a solid sample.

6 The Bureau's Work on the Platinum Metals

At the meeting of the American Electrochemical Society, May 3 to 5, two papers were presented by members of the Bureau's staff on the work in connection with platinum metals. The first of these papers by Messrs. Jordan and Wichers was presented by Mr. Jordan and described the general work on the metals of the platinum group under way at the Bureau of Standards.

The second paper, by R. P. Neville, dealt with the preparation of pure platinum and platinum-rhodium alloy for thermocouples.

7 Heat Treatment and Properties of Magnet Steels

The Metallurgical and Electrical Divisions of the Bureau, in cooperation, are beginning an investigation to determine the effects of various heat treatments upon the characteristic properties of the steels now used commercially or suggested for use in the manufacture of permanent magnets. During the past month about 10 samples were hardened, and it is hoped that they will soon be ready for the first magnetic tests.

8 Non-Destructive Testing of Wire Rope

The Bureau of Standards is about to undertaken an investigation of the possibilities of using non-destructive methods for testing wire rope with special reference to hoisting rope. Present methods of inspection are unsatisfactory and do not unfailingly tell when it is necessary to remove the rope from service. The object of this investigation is to develop, if possible, some method by which an actual test can be made to

determine the condition of the rope with respect to its deterioration in service, without destroying it. An advisory committee is being organized which will be composed of representatives of the principal interests connected with the manufacture, use, and testing of wire rope, and the first meeting of the committee with be held at the Bureau on June 16 for the purpose of discussing plans and method of procedure in the work.

9 Steel for Brinell Balls

In measuring the hardness of metals by the Brinell method, a hardened steel ball is forced into the specimen by hydraulic pressure, the amount of penetration serving as an indication of the hardness of the sample. Difficulty has been found in measuring the Brinell hardness of steel having a hardness over 500 B.h.n. An attempt has been made by the Bureau for the past 3 or 4 years to obtain a very hard steel which will carry the load of 3000 kg without fracture, but up to the present without success. Tungsten carbide has been suggested, but it has been impossible to obtain this material in suitable condition in either this country or Germany. Recently a very hard vanadium steel made at the Bureau's laboratories has been tried and shows promise of success. More of it will be made, and if future experiments are successful, an important advance in the art of hardness testing may result.

10 Fatigue Tests of Limestone

As noted last month, the Bureau of Standards is carrying out a series of tests to determine to what extent stone will fatigue under a continuous load. The specimens are prepared in the form of beams which are supported at the ends and have a load suspended from the center which is calculated to give a stress in the stone equivalent to two-thirds of the ultimate strength. Deflection measurements are being made at intervals to determine if there is a continuous sagging, which apparently is the case according to measurements which have been made to date.

11 Colorless Waterproofing Materials for Stone

Investigations are now under way at the Bureau of Standards covering the action of frost on building stone and on the value of colorless waterproofing materials with which to protect the surface of stone structures. During the last month the series of exposure tests on colorless waterproofing materials, having for its object the determination of the relative durability of these treatments under weather conditions, has been supplemented by a series of tests to determine the efficiency of the different waterproofing materials in preventing decay of the stone.

Crystallization tests are being made on waterproofed specimens of stone, as mentioned in the last Bulletin, to secure a comparison between treated and untreated specimens. Waterproofed specimens have also been exposed to the weather and will be tested after a considerable period of exposure.

12 Methods of Measuring Plasticity of Clays

Probably the most characteristic property of clay is plasticity, yet there is at present no entirely satisfactory method of measuring it due, perhaps, to the difficulty of defining plasticity in terms that are capable of mathematical expression. A study of this subject has been made by the Bureau of Standards and is described in Technologic Paper No. 234 of the Bureau of Standards, which has just been issued and can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10¢ a copy.

The first part of this paper presents certain criticisms of the various methods of determining plasticity, while the second part is devoted to the presentation of experimental data collected with the use of the Bingham plastometer, an instrument which has recently been brought forward for the measurement of the plasticity of paints, greases, and other semi-rigid materials. The plastometer is a modified capillary viscosimeter.

Plasticity has been resolved into its two components by Bingham, and the Bingham plastometer is supposed to give a measure of these two components designated as yield value and mobility. A certain equation has been developed by Bingham giving the relation between the two factors of plasticity of a material and the dimensions of the capillary tube used in the plastometer. This equation, together with a modification, has been proven by Bingham to hold for paints, but in the case of clay slips with which the present investigation deals the equation does not hold true, as is shown in this paper. This is due to an end effect which is not taken into account in the equations, and which has not yet been evaluated. Thus, these two factors, viz., yield value and mobility, cannot yet be expressed in absolute units, but by using the same capillary some interesting comparisons of several types of clays and the effect of addition of certain materials and reagents to clay slip have been obtained. It is believed that by using the same capillary in a comparative manner the relative plasticities of clays can be determined.

13 New Mollier Chart for Ammonia

Circular No. 142 of the Bureau of Standards, containing tables of the thermodynamic properties of ammonia, was published a short time ago, as mentioned in the last number of the Technical News Bulletin. Information of this kind, which is similar in nature to that in the familiar steam tables, can also be conveniently arranged graphically in the form of a Mollier chart. Such a chart is of great value to engineers and in order to meet the needs of the refrigeration industry, the data contained in the above-mentioned circular have just been published in graphic form as Miscellaneous Publication No. 52, which can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5¢ a copy.

Numerous forms of such charts have been published not only for steam and ammonia but for other materials, but it is believed that in arrangement the present chart possesses certain advantages over previous ones. The coordinates are pressure (plotted to a logarithmic scale) as ordinates and heat content as abscissae. The chart measures 10 1/2 inches high by 25 inches wide, a convenient size for desk use. Lines of constant entropy, volume, temperature, and quality are drawn on the chart.

The chart is printed in black ink only. While thus avoiding two-color printing and its attendant loss in accuracy, the arrangement is such that lines are clearly distinguishable, and can be readily recognized and followed. Pressures and volumes can easily be read with an accuracy of 1% and heat content to within 0.5 Btu. By the use of the chart, it is possible to analyze the processes occurring in a refrigerating cycle and to determine, for example, the work of compression, the heat absorbed by the ammonia evaporated, the volume of the vapor at various stages of the cycle, etc. The chart may be used as a complete substitute for the tables in calculations which do not require the highest degree of accuracy and such computations can be carried out by this means with much greater speed than is possible from data presented in tabular form.

14 A Method for the Measurement of Sound Intensity

Scientific Paper No. 473 of the Bureau of Standards deals with a method for the measurement of sound intensity. Copies can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5¢ each.

The method presented in this paper has a wide range of sensitivity and permits sound approaching the threshold value of audibility to be measured and does not require the calibration of an amplifier. The measuring instrument consists of a magneto-phone or electrostatic transmitter and two coils whose mutual inductance can be varied by known amounts. The emf generated by the magneto-phone, due to its presence in the sound field, is compared with the emf generated in one coil when the other carries a known current.

Comparisons are made by successively impressing the emf upon an indicating instrument consisting of an amplifier, a rectifier, and a galvanometer. The mutual inductance between the two coils is varied until the two emfs are equal. The emf generated in the second coil can be computed and since the sound intensity at the magneto-phone is proportional to the square of the emf generated, means of making sound intensity measurements is presented. Absolute calibration is made by comparison with a Rayleigh disk.

15 Investigation of Orifice Gas Meters

For several months the Bureau of Standards had had under way the preliminary arrangements for an investigation of the performance of orifice meters. Certain special equipment,

such as large size air compressors, cooling coils, receivers, test lines (made of extra heavy piping), besides indicating instruments are necessary to carry out work of this character, and it has been largely because of the excellent facilities offered to the Bureau of Standards by the War Department at Edgewood Arsenal, Edgewood, Maryland, that the taking up of this investigation has been possible. The present investigation has been limited to a study of the orifice meter of the type used in the commercial measuring of gas. The principal problem of the investigation is to determine the discharge coefficient under all the variable circumstances which may occur within the range of commercial or engineering practice.

In order to solve this problem, it will be necessary to make a careful study of the effect of the following variables upon the discharge coefficient: (1) The shape of the orifice, which may vary from a sharp-edged hole in a thin diaphragm to a long flow nozzle; (2) the diameters of the pipe and orifice, i.e., the size and area ratio of the orifice; (3) the location, size, and finish of the pressure taps; (4) the length of straight pipe on each side of the orifice or the nature of the fitting or obstructions near the orifice; (5) the linear speed through the orifice or the rate of flow; (6) the absolute pressure in the line and the magnitude of the differential; (7) the density, viscosity, and specific heat ratio of the gas and its deviation from Boyle's law; and (8) steadiness or pulsation of the flow.

The set-up,as now arranged,will permit the study with air of points Nos. 1 to 6, as enumerated above, through a wide range of conditions. It may also be possible to give special attention to item No. 8. It is hoped that when this work is completed it will be possible to make experiments using natural gas or other gases for the investigation of point No. 7.

Up to the present time only a few preliminary runs have been made. During these runs approximate checks were made of the discharge coefficients of the flow nozzles which are used in to be the final measurement. These runs have also served to bring out defects in the equipment and have thus furnished a basis for making alterations and improvements. It is expected that actual tests will be started within a few days.

16 Analysis of Complicated Spectra

Progress is being made in the analysis of complicated spectra by the Bureau of Standards. A paper on series in the arc spectrum of molybdenum is in preparation, and a preliminary report on the regularities in the arc spectrum of iron has been submitted to the Journal of the Washington Academy of Sciences. This is the first instance of significant regularities being discovered for any of the chemical elements in the VIII group of the periodic table. Over 200 of the stronger lines in the iron spectrum are now accounted for. Similar regularities have been discovered in the arc spectrum of titanium.

17 Directive Radio Transmission on a Wave-Length of 10 Meters

Until recently, radio communication was for the most part carried on from a transmitting station to one receiving station, that is, it was "point-to-point" communication. There were only a few special kinds of service, such as time and weather signals, which were transmitted from a sending station to any considerable number of receiving stations. However, even in the case of "point-to-point" communication, radio signals were sent out in every direction and could, if desired, be received by any station within a certain distance regardless of its position with respect to the transmitting station. Since the total number of messages sent was small, a comparatively small number of wave lengths was sufficient to take care of traffic requirements. With the development of radiotelephone transmitting apparatus, the broadcasting of voice or music by radio has assumed an important position, and the waves used in this work occupy a wider band of wave lengths than the sharp waves used for radio telegraph signals. With the greatly increased traffic and the much wider band of wave lengths which it occupies, considerable interference has developed among broadcasting stations and between broadcasting stations and radiotelegraph stations.

There are two ways of reducing such interference: To direct the waves from the transmitting station in a narrow beam toward the receiving station and to employ in such transmission shorter wave-lengths than have heretofore been used. In England investigations have been made of directive short wave transmission and at the Bureau of Standards experiments have been conducted on transmitting apparatus employing electron tubes which transmits a directed beam of radio waves and employs waves as short as 10 meters. In these experiments a reflector has been used consisting of short, parallel, vertical wires arranged on a frame shaped like a parabola or reflector functioning in much the same way as the mirror for light waves. Forty vertical wires were used and the generating set with its small antenna was placed in the focus of the parabola, each wire was tuned separately to 10 meters by adjusting its length, and it was found that about 75% of the radiated energy could be confined within an angle of approximately 75°.

The apparatus is described in Scientific Paper No. 469 of the Bureau of Standards and can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10¢ a copy.

18 Radio Signals of Standard Frequency

The transmission of radio signals of standard frequency by the Bureau of Standards (Station WWV) has been previously mentioned in the Bulletin. The following is a schedule of the signals which will be transmitted during the next four months and should prove of interest to the operators of all stations which transmit on frequencies above 425 kilocycles, as they may be used for checking wavemeters and adjusting

transmitting and receiving apparatus. The accuracy of these signals is better than 0.3 or 1%. More details may be obtained from Letter Circular 92 which will be supplied on application to the Bureau of Standards.

Commercial and ship stations should be especially interested in the 425, 500, and 600 kilocycle waves, since the 425 k.c. wave is the new frequency allotted by the Department of Commerce for commercial ship traffic. The remainder of the schedule includes frequencies used by broadcasting and amateur stations, the transmissions on the morning of October 7 being especially for such stations and including only frequencies used by them.

Schedule of Transmission

Eastern Std. Time	Signal	Kilocycles (Wave length in meters) June 11	July 17	Aug. 15	Sept. 12	Sept. 28	Eastern Std. Time	Oct. 7
10:55-11:04	General Call	400	425	425	425	500	1:55-2:04	1350
11:04-11:08	Std. Frequency	(750)	(705)	(705)	(705)	(600)	2:04-2:08	(222)
11:08-11:11	Announcements						2:08-2:11	
11:15-11:19	General Call	500	500	500	500	700	2:15-2:19	1500
11:19-11:23	Std. Frequency	(600)	(600)	(600)	(600)	(428)	2:19-2:23	(200)
11:23-11:26	Announcements						2:23-2:26	
11:30-11:34	General Call	600	666	666	666	900	2:30-2:34	1600
11:34-11:38	Std. Frequency	(500)	(450)	(450)	(450)	(333)	2:34-2:38	(187)
11:38-11:41	Announcements						2:38-2:41	
11:45-11:49	General Call	700	850	850	850	1100	2:45-2:49	1700
11:49-11:53	Std. Frequency	(428)	(352)	(352)	(352)	(273)	2:49-2:53	(176)
11:53-11:56	Announcements						2:53-2:56	
12:00-12:04	General Call	800	1000	1000	1000	1300	3:00-3:04	1800
12:04-12:08	Std. Frequency	(375)	(300)	(300)	(300)	(231)	3:04-3:08	(167)
12:08-12:11	Announcements						3:08-3:11	
12:15-12:19	General Call	900	1250	1250	1250	1500	3:15-3:19	1900
12:19-12:23	Std. Frequency	(333)	(240)	(240)	(240)	(200)	3:19-3:23	(158)
12:23-12:26	Announcements						3:23-3:26	
12:30-12:34	General Call	1000	1500	1500	1500	1700	3:30-3:34	2000
12:34-12:38	Std. Frequency	(300)	(200)	(200)	(200)	(176)	3:34-3:38	(150)
12:38-12:41	Announcements						3:38-3:41	

The time indicated above from 11:00 to 11:56 is P.M., and from 12:00 to 12:41 is A.M.

In the foregoing schedule the general call is given by voice during the first half of the 4-minute period and by continuous wave telegraph during the second half. This call is given to enable listeners to tune in "WWV." The "standard frequency signals" consist of the call letters "WWV" repeated with very long dashes intervening and are transmitted by unmodulated continuous waves. The "announcements" are made by voice during the first half of the period and by continuous wave telegraphy during the latter half. The general call and the announcements are made on the same frequency as the standard frequency signals and may be used for some measurement purposes, but it is recommended that accurate measurements be made on the standard frequency signals only. With sensitive receiving apparatus, it should be possible to receive these signals anywhere east of the Mississippi River.

19 Radio Frequency Indicator for Broadcasting Stations

At the Second National Radio Conference held in Washington from March 20-24, 1923, it was resolved, among other things "That every broadcasting station should be equipped with apparatus such as a tuned circuit coupled to the antenna and containing an indicating instrument or the equivalant for the purpose of maintaining the operating wave frequency within two kilocycles of the assigned wave frequency."

The Bureau of Standards has designed a preliminary model of a radio frequency indicator to meet the above need and has prepared specifications covering its construction. These specifications may be had by any broadcasting station upon request. The instrument consists essentially of a 72-turn space-wound coil on a 3 3/4" tube, an air condenser, and a sensitive thermo-galvanometer. These three elements are connected in series. The condenser, which is of the variable type, is provided with a locking device so that it may be locked and soldered into position after the instrument has been adjusted to indicate the required frequency. This instrument may be set to indicate any radio frequency in the range from 1350 kilocycles (222 meters) to 550 kilocycles (545 meters).

If an instrument is constructed according to the specifications and sent to the Bureau of Standards Radio Laboratory, by a licensed broadcasting station, it will be adjusted for a nominal fee to operate at the frequency of the station.

20 The Protection of Buildings Against Lightning

The Sectional Committee on Protection Against Lightning organized jointly by the Bureau of Standards and the American Institute of Electrical Engineers, has been active in the preparation of a tentative standard for the protection of buildings and other property against lightning. A joint meeting of Group I of the Sectional Committee in charge of

the work, together with the National Fire Protection Association's Committee on the same subject, was held in Chicago on May 7 so as to secure the view of the various members. Copies of the tentative standard have also been circulated generally for comment by those interested, and the final draft is now being worked out.

21 Electrolysis Survey in Galveston, Texas

As previously mentioned, a survey of electrolysis conditions in Galveston, Texas, was undertaken primarily for the purpose of comparing data obtained by the use of the earth current meter with potential difference measurements. The field work of this investigation was completed on May 19.

The results are similar to those obtained in Atlanta and New Orleans and indicate that where a number of conductors are buried near each other, some of which are directly or indirectly connected to the negative bus of the railway power house, the potentials of the structures with respect to adjacent street car tracks do not necessarily indicate whether the structure is discharging or collecting current. A pipe, the potential of which was positive to the nearest street car track, was found to be collecting current and although the potential of another pipe was decidedly negative to a rail directly above it, it was found to be discharging current and was so badly corroded that a leak was found when the corrosion products were removed.

22 Effect of Certain Impurities in Storage Battery Electrolytes

The importance of obtaining information concerning the action of impurities in storage battery electrolytes arises from the detrimental effects which many of them produce on the operating characteristics and life of the storage battery. Such information is necessary as a basis for the preparation of specifications covering sulphuric acid for use in batteries. A new method of measuring the rate of sulphation of storage battery plates was recently devised at the Bureau of Standards. The same method and apparatus have been employed in the present investigation with some modifications, and the effects of small amounts of iron, manganese, platinum, and copper have been determined. It was found that the presence of 1 part in 10 000 000 of platinum in the electrolyte increases the local action at the negative plates 50%; the effect of copper is much less, while the effect of iron is of unusual interest because of its accelerating action at the negative plates. Manganese deposits upon the positive plates in the form of manganese dioxide which covers the active material, closes the pores, and causes a large amount of charging current to be wasted as gas. Work is being extended to include the effect of other impurities.

23 Recent Articles on the Paper Work of the Bureau

A report of the experimental manufacture of condenser paper for power condensers by the Bureau of Standards was prepared and published in Paper Industry for May, 1923.

This report describes the methods and procedure used to obtain a light weight paper free from electrically conducting particles.

An additional study has been made of rubber latex in paper to determine whether the rubber undergoes any change, and a report on this subject has been prepared for the India Rubber World. It was found that after a few days the chloroform extract decreased while the acetone extract increased. It would seem that the rubber had changed by oxidation.

24 The Production of Hydrogen by the Thermal Decomposition of Oil

An article on the production of hydrogen by the thermal decomposition of oil by E. R. Weaver is being published in three instalments in Chemical and Metallurgical Engineering. The first of these appears on page 764 of this journal and may be summarized as follows:

An experimental investigation of the manufacture of hydrogen by decomposing hydrocarbons at high temperature is described. Complete decomposition by the hydrocarbons was effected, but carbon dioxide remained as an impurity. The source of this compound was ascertained and means for eliminating it suggested. The major requirements for a successful commercial plant are outlined and costs of production estimated for plants of various sizes.

25 Uniformity of Sole Leather

The Bureau of Standards has completed arrangements with one of the large leather companies whereby certain samples of sole leather will be furnished every two weeks for a period of six months. Water absorption, water penetration, density, and abrasion tests will be made on these samples together with chemical analyses to determine the degree of uniformity to be expected in this product over a given period of time and also to determine the suitability of the abrasion apparatus for routine, commercial, and specification testing work.

Service tests have been started at the request of a manufacturer to determine the comparative wear of soles which were originally 7 1/2 iron in thickness but which had the flesh cut off so that the thickness was 6 1/2 iron as compared with soles having an original thickness of 6 1/2 iron (1 iron = 1/48 inch).

26 Meeting of Sectional Committee on Aeronautical Safety Code

The Sectional Committee which is developing the American Aeronautical Safety Code held a meeting at the Bureau of Standards on May 25. At this meeting the committee adopted reports of two subcommittees consisting of rules for balloons, airships, landing fields, seaplane stations, and airways. These parts of the code are now available for general use and application.

PUBLICATIONS OF THE BUREAU OF STANDARDS RELEASED DURING MAY.

Scientific Papers

S 468 Formulas and tables for the calculation of the inductance of coils of polygonal form. Frederick W. Grover. 10¢

S 469 Directive radio transmission on a wave length of 10 meters. Francis W. Dunmore and Francis H. Engel. 10¢

S 473 A method for the measurement of sound intensity. J. C. Karcher 5¢

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Respectfully,

George K. Burgess, Director
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